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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,862	09/22/2003	Christof Mehler	53935	4311

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EXAMINER	
CREPEAU, JONATHAN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/664,862	MEHLER ET AL.	
	Examiner	Art Unit	
	Jonathan Crepeau	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,8 and 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,8 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/8/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1, 2, 8, and 9. The claims remain rejected under 35 USC 103 for substantially the reasons of record. In addition, the claims are newly rejected under 35 USC 112, second paragraph as necessitated by amendment. Accordingly, this action is made final.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 2, 8, and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 has been amended to recite that the polymer blend comprises from 45-85 wt% of blend polymers and from 15-55 wt% of carbon fillers. However, this is inconsistent with the subsequent recitation that the carbon fibers are present in an amount from "5 to 60 wt%" based on the total weight of the polymer blend. If the fibers are contained in the amount of 60 % specified in the latter range, this would be outside the range of carbon fillers recited in the former range. Correction is required.

Claim Rejections - 35 USC § 103

4. Claims 1, 2, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1011164 in view of Thielen et al (U.S. Patent 6,331,586) in view of JP 2002-097375.

EP '164 is directed to a PEM fuel cell comprising a separator plate comprising a polymer binder, a powdery carbon filler, and a short fiber (see abstract). The polymer may comprise a variety of materials including polyamide, polyethersulfone, or polyether ketone (see [0018]). The short fiber may comprise carbon fiber and carbon filler may comprise carbon black.

EP '164 does not expressly teach that the binder comprises a polymer blend which includes at least two mutually nonmiscible blend polymers in a co-continuous or intercalated structure, as recited in claim 1.

Thielen et al. is directed to conductive polymer blend having a co-continuous structure (see abstract). The conductive material (e.g., including carbon black and carbon fiber) is substantially localized in one of the polymers (see col. 4, line 15). The blend polymers may comprise a variety of polymers including polyamides and polyethers (col. 6, line 21).

Therefore, it is submitted that the artisan would be motivated to use the co-continuous polymer blend of Thielen et al. in the separator plate of EP '164. In column 3, line 24, Thielen et al. state that an object of the invention is "to provide a conductive polymer blend which is suitable for processing by any method, including blow molding," and further state that the polymer blends have "improved mechanical properties." In column 11, line 30, it is taught that "[a] wide variety of articles may be produced from the polymer blends of the invention" including "components for electronic equipment." Accordingly, the skilled artisan would be

sufficiently motivated to incorporate the polymer blend of Thielen et al. into the separator plate of EP '164.

Regarding the composition of the plate recited in instant claim 1, it would be obvious to use at least one polyamide and at least one polyether ketone or polyether sulfone as the blend polymers of Thielen et al. As noted above, EP '164 expressly discloses each of these materials, and Thielen et al. teach polyamides as well as polyethers in general. Further, Thielen et al. teach at column 6, line 45, "[i]n general, any pair of polymers may be selected for a blend provided that the two polymers present at least some degree of immiscibility and preferably differ in their polarity." Accordingly, the artisan would be sufficiently skilled to use the claimed polymers in the blend of EP '164.

However, neither EP '164 nor Thielen et al. expressly teaches that the carbon filler comprises carbon nanotubes, as recited in claim 1.

JP 2002-097375 is directed to a thermoplastic resin composition comprising carbon fiber and carbon nanotube that is suitable for use in a fuel cell separator (see abstract). The carbon fiber is present in an amount of 10-70 wt% and the carbon nanotube is present in an amount of 0.1-15 wt% (see paragraphs [0018] and [0021] of the machine translation).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the nanotubes of JP '375 in the separator plate of EP '164. In the abstract, JP '375 teaches that the object of the invention is to "obtain a thermoplastic resin composition having excellent electroconductivity, gas barrier properties, strength, corrosion resistance and moldability."

Accordingly, the artisan would be motivated to use the nanotubes of JP '375 in the separator plate of EP '164, in addition to the carbon materials already disclosed by EP '164.

Regarding the weight ratios recited in claims 1, 4, and 7, it would be well within the skill of the art to vary the specific amounts of carbon black, carbon fiber, carbon nanotubes, and blend polymer(s) to affect the characteristics of the separator plate. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). In this case, the artisan would be able to optimize the conductivity of the plate in light of its mechanical integrity. Further, JP '375 provides specific weight ranges and rationales for maintaining the fiber and nanotube contents within these ranges ([0018], [0021]). Thus, it would be obvious to manipulate the amounts of carbon materials and polymers to amounts encompassed by the claimed ranges.

Response to Arguments

5. Applicant's arguments filed July 2, 2008 have been fully considered but they are not persuasive. Regarding Applicant's argument "1" that the combination of references would not result in a polymer blend comprising the claimed amount of carbon fillers, it is noted that Applicant discusses each reference individually and then asserts that the claimed range would not be obvious over the combination as a whole. However, it is noted that the Shigeru reference discloses a carbon fiber content of 10-70 wt% and nanotube content of 0.1-15 wt%, which fall within the claimed ranges. Furthermore, the amounts of carbon fillers in the proposed

combination of Saito, Thielen et al., and Shigeru are result-effective variables that are optimizable according to the rationale provide above. Since Applicant has not provided any evidence as to why the now-claimed ranges produce an unexpected or unpredictable result over the applied references, the rejection is believed to be proper.

Regarding Applicant's argument "2" that the references do not obviate a polymer blend comprising at least one polyamide and at least one polyether ketone or polyether sulfone as blend polymers, these arguments are cumulative of, and in some cases identical to, arguments previously made by Applicants and already addressed by the Office. Accordingly, Applicant is referred to previous Office actions for responses to these arguments.

Regarding Applicant's argument "3" that in addition to failing to disclose the specific polymers, the references do not disclose the weight ratio required by the amended claims, the above statements by the Examiner are also applicable to this argument. In particular, the weight ratio of the polymers is also considered to be a result-effective variable that affects the mechanical and co-continuous structural properties of the separator plate.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795
May 18, 2009